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ABSTRACT

Brief abstracts of projects funded by the Energy Research and Development Administration (ERDA) and conducted under the National Program for Solar Heating and Cooling of Buildings are presented in three volumes. This, the second volume, identifies the major efforts currently underway in support of the national program. The National Aeronautics and Space Administration (NASA) is responsible for the management of the projects contained in the first section, Development in Support of the Demonstrations. The major thrust of this program is to ensure that truly marketable solar energy systems and subsystems will be available for testing and evaluation in the demonstration program. The second section of the report, Standards and Criteria Development, reflects the effort conducted by the National Bureau of Standards (NBS). It contains efforts underway to satisfy both ERDA and the Department of Housing and Urban Development (HUD) requirements for solar systems such as performance criteria; standards, test, and evaluation; and technical data requirements. (Author/MLF)

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ERDA 76-128

NATIONAL PROGRAM FOR SOLAR HEATING AND COOLING OF BUILDINGS

PROJECT DATA SUMMARIES

VOL. II DEMONSTRATION SUPPORT

ED158386

EA 010 795

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
DIVISION OF SOLAR ENERGY
WASHINGTON, D.C. 20545

NOVEMBER 1976

FOREWORD

The National Program for Solar Heating and Cooling of Buildings, directed by the Energy Research and Development Administration (ERDA), responds to the Solar Heating and Cooling Demonstration Act of 1974. P.L. 93-409, September 3, 1974. That act called for programs to develop, demonstrate, and promote the use of solar heating and cooling systems. The role of the Federal government in this program is to stimulate use of solar heating and cooling equipment and to assist industry with technology development and systems demonstrations leading to the widespread use of solar energy at the earliest possible time.

The overall Federal program includes demonstrations of heating and/or combined cooling for residential and commercial buildings using available equipment and later incorporating technological advancements directed at improved efficiency and reduced cost of procurement and operation. The schedule adopted for this program follows the Congressional directive in P.L. 93-409, "(b) . . . to provide for the demonstration within a three-year period of the practical use of solar heating technology and to provide for the development and demonstration within a five-year period of the practical use of combined heating and cooling technology."

A comprehensive discussion of the National Program for Solar Heating and Cooling of Buildings, is contained in ERDA Report 23A, dated October 1975. This report is being updated and will be redesignated ERDA 76-6 and is scheduled to be republished October 1976.

This document presents brief abstracts of projects funded by ERDA and conducted under the National Program for Solar Heating and Cooling of Buildings thru July 1976. It encompasses the following: Commercial and Residential Demonstrations, Demonstration Support, and Research and Development. The subject matter is presented in three volumes:

Volume I – Commercial & Residential Demonstrations

Volume I presents brief descriptive overviews of the design and operating characteristics of the solar heating and cooling systems and of the structures themselves. Also included are available pictures of the buildings and sketches of the solar energy systems.

Volume II – Demonstration Support

Volume II reports on associated development supporting the demonstration program and the development of system performance standards and criteria and certification criteria.

Volume III – Research & Development

This volume presents a brief description of all of the research and development projects presently supported in the areas of collectors, thermal energy storage, solar heat pumps, solar cooling systems, and controls.

NOTE: The information contained herein represents current plans, and as such, is subject to change. Errors or omissions should be brought to the attention of the Demonstration Branch, Division of Solar Energy.

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INTRODUCTION

This document identifies the major efforts currently underway in support of the Nation Program for Solar Heating and Cooling of Buildings. This volume is divided into two sections:

Section I – Development in Support of the Demonstrations

The National Aeronautics and Space Administration (NASA) is responsible for the management of the projects contained in this section. The major thrust of this program is to ensure that truly marketable solar energy systems and subsystems will be available for testing and evaluation in the demonstration program.

Section II – Standards and Criteria Development

The effort reflected in this section is conducted by the National Bureau of Standards (NBS). It contains efforts underway to satisfy both ERDA and the Department of Housing and Urban Development (HUD) requirements for solar system such as: performance criteria; standards, test and evaluation; and technical data requirements.

SECTION I

DEVELOPMENT IN SUPPORT OF DEMONSTRATIONS

PROJECT TITLE: Systems Design and Development

PRINCIPAL INVESTIGATOR: James W. Clark

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Airesearch Manufacturing Co.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32091

RFP NO.: AP32-75-404

EFFECTIVE DATE: July 12, 1976

DURATION: 3 Years and 6 Weeks

AMOUNT: $4,800,000

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Design, develop, deliver, install and test various size marketable solar heating and cooling systems in single family, multi-family and commercial sizes.

The development effort is largely associated with a variable speed, electrically driven, solar assisted heat pump for heating with a solar driven, variable speed, rankine engine driver for cooling.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Single Family Heating	2	$8x10^4$ BTU/Hr	November 15, 1977
Multi-family Heating	2	$8x10^5$ BTU/Hr	November 15, 1977
Commercial Heating	2	.25 to $7.6x10^6$ BTU/Hr	November 15, 1977
Single Family Heating & Cooling	2	Heating $8x10^4$ BTU/Hr; Cooling 3 Ton	May 15, 1978
Multi-family Heating & Cooling	2	Heating $8x10^5$ BTU/Hr; Cooling 25 Ton	May 15, 1978
Commercial Heating & Cooling	2	Heating .25 to $1.6x10^6$ BTU/Hr; Cooling 10 to 50 Ton	May 15, 1978

Note: All systems include a hot water subsystem

Government Furnished Parts Required:

Item	Quantity	Delivery Date
Site Data Acquisition System	12	To be determined
System Performance Measurement Sensors	To be determined	To be determined

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	Heating September 1976; Heating & Cooling December 1976
System Design Review	Heating July 1977; Heating & Cooling October 1977
Operational Test Review	Heating June 1978; Heating & Cooling June 1979

PROJECT TITLE: Systems Design and Development

PRINCIPAL INVESTIGATOR: William L. Moore

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: General Electric Co.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32092

RFP NO.: AP32-75-404

EFFECTIVE DATE: August 20, 1976

DURATION: 38 Months

AMOUNT: $6,700,000

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Design, develop, deliver, install and test various size marketable solar heating and cooling systems in single family, multi-family and commercial sizes.

The development effort is largely associated with vacuum tube, high efficiency collectors and a rankine cycle rotary vaned expanded driver for their heat pump to be used for cooling operations.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Single Family Heating	2	$8x10^4$ BTU/Hr	November 15, 1977
Multi-family Heating	2	$8x10^5$ BTU/Hr	November 15, 1977
Commercial Heating	2	$2x10^6$ BTU/Hr	November 15, 1977
Single Family Heating & Cooling	2	Heating $8x10^4$ BTU/Hr; Cooling 3-Ton	May 15, 1978
Multi-family Heating & Cooling	2	Heating $8x10^5$ BTU/Hr; Cooling 2-Ton	May 15, 1978
Commercial Heating & Cooling	2	Heating $2x10^6$ BTU/Hr; Cooling 7-Ton	May 15, 1978

Note: All Systems include a domestic hot water subsystem

Government Furnished Parts Required:

Item	Quantity	Delivery Date
Site Data Acquisition System	12	To be determined
System Performance Measurement Sensors	To be determined	To be determined

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	Heating September 1976; Heating & Cooling November 1976
System Design Review	Heating April 1977; Heating & Cooling October 1977
Operational Test Review	Heating June 1977; Heating & Cooling June 1977

PROJECT TITLE: Systems Design and Development

PRINCIPAL INVESTIGATOR: Albert C. Krupnick

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Honeywell, Inc.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32093

RFP NO.: AP32-75-404

EFFECTIVE DATE: July 9, 1976

DURATION: 3 Years and 11 Weeks

AMOUNT: $3,936,000

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Design, develop and deliver marketable solar heating and cooling systems in single family, multi-family and commercial sizes.

The development effort is largely associated with a rankine engine drive for their vapor compression cycle air conditioner.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Single Family Heating	2	$8x10^4$ BTU/Hr	November 15, 1977
Multi-family Heating	2	$8x10^5$ BTU/Hr	November 15, 1977
Commercial Heating	2	$8x10^6$ BTU/Hr	November 15, 1977
Single Family Heating & Cooling	2	Heating $8x10^4$ BTU/Hr; Cooling 3-Ton	May 15, 1978
Multi-family Heating & Cooling	2	Heating $8x10^5$ BTU/Hr; Cooling 2-Ton	May 15, 1978
Commercial Heating & Cooling	2	Heating $2x10^6$ BTU/Hr; Cooling 7-Ton	May 15, 1978

Note: All systems include a domestic hot water subsystem

Government Furnished Parts Required:

Item	Quantity	Delivery Date
Site Data Acquisition System	12	To be determined
System Performance Measurement Sensors	To be determined	To be determined

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	Heating October 1976; Heating & Cooling January 1976
System Design Review	Heating March 1977; Heating & Cooling August 1977
Operational Test Review	Heating February 1979; Heating & Cooling August 1979

PROJECT TITLE: Existing Systems that Require Additional Development

PRINCIPAL INVESTIGATOR: Mitchell Cash

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Ayres & Hayakawa, Inc.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: To be determined

RFP NO.: AP32-75-406

EFFECTIVE DATE: To be determined

DURATION: 23 Months

AMOUNT: $149,000

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Ayres & Hayakawa proposes to design and construct a building with a semi-passive space heating and cooling system as a solar energy system integral with a commercial office building. The heating and cooling system is based on the "Skytherm" system. The system will be designed to meet local codes and will be verified through an operational test program to prove the system's performance. Documentation will be provided of the performance test results as well as documentation for system construction, operation and maintenance. A design data brochure will be provided for use by others in planning for and using the system.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Commercial Heating and Cooling System	1	Heating and Cooling for a 14,400 Sq. Ft. Office Building	August 1978

Government Furnished Parts Required:

Item	Quantity	Delivery Date
Instrumentation	To be determined	To be determined
Site Data Acquisition Subsystem	1	To be determined

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	December 1976
System Design Review	January 1977
Operational Test Review	August 1978

PROJECT TITLE: Existing Systems that Require Additional Development

PRINCIPAL INVESTIGATOR: Mitchell Cash

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Colt, Inc.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: To be determined

RFP NO.: AP32-75-406

EFFECTIVE DATE: To be determined

DURATION: 31 Months

AMOUNT: $313,000

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Colt proposes to manufacture and deliver two commercial space heating and hot water systems. The collector to be developed is based on the design of the Los Alamos Scientific Laboratory and will be produced under a non-exclusive license. The development effort includes simplifying the Los Alamos Scientific Laboratory design for manufacturing. The necessary tests to verify that the system meets the Performance Specification, the Interim Performance Criteria, and other national and local standards and codes will be performed. The certification will be based on the National Bureau of Standards requirements. Documentation will be provided for all test phases to assure design performance specifications are met. Installation, Operational and Maintenance Manuals, as well as a Design Data Brochure will be provided for use by others in planning for and operating the system. A flame and toxic gas barrier will be added on the exposed urethane foam inside the building. A "double wall" approach for protection of potable hot water will be included that will meet local codes.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Commercial Heating and Hot Water System	2	Heating–18,438 BTU/Month Hot Water–50 Gals/Day at 150° F	January 1978

Government Furnished Parts Required:

Item	Quantity	Delivery Date
Instrumentation	To be determined	To be determined
Site Data Acquisition Subsystem	2	To be determined

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	January 1977
System Design Review	July 1977
Operational Test Review	April 1979

PROJECT TITLE: Existing Systems that Require Additional Development

PRINCIPAL INVESTIGATOR: Valmore Fogle

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Contemporary Systems, Inc.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32243

RFP NO.: AP3[illegible]-75-406

EFFECTIVE DATE: October 1976

DURATION: 20 Months

AMOUNT: $67,500

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Contemporary Systems proposes, through operational test and experimentation, to improve their system design and performance. They also will endeavor to improve the manufacturing techniques to reduce costs. A hot air system was installed on their facility for research and test purposes. The collector design reduces installation labor and time at the construction site. They have also designed an air handling system and plan to develop, manufacture and verify these units with their system. Each air handling unit will be matched to the building requirement. Installation operation and maintenance manuals, as well as a design data brochure, will be developed for use in planning for and operating the system.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Single Family Space Heating System	2	Heat for a 1070 sq. ft. house	September 1977

Government Furnished Parts Required:

Item	Quantity	Delivery Date
Instrumentation	To be determined	August 1977
Site Data Acquisition Subsystem	2	September 1977

SIGNIFICANT MILESTONES:

	Date
Perliminary Design Review	January 1977
System Design Review	July 1977
Operational Test Review	April 1978

PROJECT TITLE: Existing Systems that Require Additional Development

PRINCIPAL INVESTIGATOR: Mitchell Cash

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Elcam, Inc.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32215

RFP NO.: AP32-75-406

EFFECTIVE DATE: September 28, 1976

DURATION: 15 Months

AMOUNT: $74,300

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: The Elcam system proposal incorporates a cost effective approach to the selection of materials and the mass production capabilities of Elcam. The hot water system will be analyzed to determine the most economical opera-modes System performance will be improved and production costs reduced. The system will be tested and verified to assure compliance to the performance specifications. Installation, operation and maintenance manuals, as well as a design data brochure, will be developed for use by others in planning for and using the system. A double-wall approach will be developed to eliminate the possibility of contamination.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Hot Water System	2	100 Gals/Day at 140° F.	June 1977

Government Furnished Parts Required:

Item	Quantity	Delivery Date
Instrumentation	To be determined	April 1977
Site Data Acquisition Subsystem	2	June 1977

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	December 1976
System Design Review	April 1976
Operational Test Review	December 1977

PROJECT TITLE: Existing Systems that Require Additional Development

PRINCIPAL INVESTIGATOR: Valmore Fogle

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Fern Engineering, Inc.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32246

RFP NO.: AP32-75-406

EFFECTIVE DATE: October 7, 1976

DURATION: 18 Months

AMOUNT: $157,000

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Development will investigate system performance and mass production manufacturing improvements. The system design will be verified through tests and analyses to assure compliance with the system performance specification and the interim performance criteria. Verification will also determine if the system will meet national codes, standards and recognized practices. The system design will be certified by the underwriters laboratory to the extent possible. Installation, operation and maintenance manuals will be prepared, as well as a design data brochure for use by others in planning for and operating the system.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Single Family Space Heating and Hot Water System	2	40 Gals/Day at 125° F. 7.5×10^6 BTU/Month	July 1977 September 1977

Government Furnished Parts Required:

Item	Quantity	Delivery Date
Instrumentation	To be determined	May 1977
Site Data Acquisition Subsystem	2	July 1977

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	January 1977
System Design Review	May 1977
Operational Test Review	March 1978

PROJECT TITLE: Existing Systems that Require Additional Development

PRINCIPAL INVESTIGATOR: Mitchell Cash

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Solaron Corporation

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32249

RFP NO.: AP32-75-406

EFFECTIVE DATE: October 1976

DURATION: 34 Months

AMOUNT: $458,300

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: The application of desiccant and heat pumps to a hot air collector system for heating and cooling will be investigated. Consultants include Colorado State University, the University of Wisconsin, and Carrier Corporation. Analysis and testing of both types will be conducted. The most cost effective system will then be selected for further development and fabrication. The prototype system will be tested under a simulated house load to assure compliance with the performance specifications. The system will then be certified by a team of registered professional engineers. Installation, operation and maintenance manuals, as well as a design data brochure, will be developed for use by others in planning and using the system.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Single Family Heating & Cooling and Hot Water System	2	Heating–11.2×10^6 BTU/Month Cooling–To be determined	August 1977 February 1978

Government Furnished Parts Required:

Item	Quantity	Delivery Date
Instrumentation	To be determined	June 1977
Site Data Acquisition Subsystem	2	August 1977

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	May 1977
System Design Review	Heating–June 1977, Cooling–November 1977
Operational Test Review	October 1978

PROJECT TITLE: Existing Systems that Require Additional Development

PRINCIPAL INVESTIGATOR: Valmore Fogle

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Solar Engineering and Equipment Co.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32247

RFP NO.: AP32-75-406

EFFECTIVE DATE: September 30, 1976

DURATION: 18 Months

AMOUNT: $155,600

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Methods of applying the tedlar cover will be developed. The system will be tested to verify and improve the performance of the collectors, particularly in the area of collector coating. Test results will be provided. Present design wil be modified to improve its manufacturability for mass production using available fabrication techniques presently employed by the Binkley Company for their standard building liner panels. Installation, operation and maintenance manuals will be provided for use by others in planning for and using the system.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Single Family Space Heating System	2	450,000 BTU/Day with Noon Solar Flux Normal Equals 300 BTU/Hr/Sq. Ft.	June 1977

Government Furnished Parts Required:

Item	Quantity	Delivery Date
Instrumentation	To be determined	March 1977
Site Data Acquisition Subsystem	2	May 1977

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	November 1976
System Design Review	December 1976
Operational Test Review	March 1978

PROJECT TITLE: Existing Systems that Require Additional Development

PRINCIPAL INVESTIGATOR: Valmore Fogle

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Solar Engineering and Manufacturing Co.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32248

RFP NO.: AP32-75-406

EFFECTIVE DATE: November 1976

DURATION: 14 Months

AMOUNT: $19,000

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: The contractor will work with the hot water tank manufacturer to develop a better insulated storage tank. The variable speed control previously developed will be redesigned and packaged for a marketable product. Certification will be obtained. Installation, operation and maintenance manuals, as well as a design data brochure, will be developed for use by others in planning for and operating the system. A double wall approach will be developed to eliminate the possibility of contamination.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Single Family Hot Water System	2	120 Gals/Day at 140° F.	June 1977

Government Furnished Parts Required:

Item	Quantity	Delivery Date
Instrumentation	To be determined	May 1977
Site Data Acquisition Subsystem	2	June 1977

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	March 1977
System Design Review	April 1977
Operational Test Review	December 1977

PROJECT TITLE: Existing Systems that Require Additional Development

PRINCIPAL INVESTIGATOR: Valmore Fogle

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Wormser Scientific Corp.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32250

RFP NO.: AP32-75-406

EFFECTIVE DATE: October 7, 1976

DURATION: 22 Months

AMOUNT: $230,000

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: The horizontally-mounted solar collector array will be modified to eliminate blocked passages and also to eliminate possible safety hazards. The use of copper rollbond sections with vertically-oriented flow patterns will be investigated. A control system for operation of the reflectors will be developed to adjust these so that maximum solar energy is reflected onto the collector array. The system will be certified by South Carolina Gas & Electric Company in cooperation with Clemson University. A complete set of installation, operation and maintenance manuals, as well as a design data brochure, will be prepared.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
A Space Heating and Hot Water System for a Four Unit Townhouse Condominium	1	80 Gals/Day at 130° F.	October 1977

Government Furnished Parts Required:

Item	Quantity	Delivery Date
Instrumentation	To be determined	June 1977
Site Data Acquisition Subsystem	1	September 1977

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	December 1976
System Design Review	March 1977
Operational Test Review	Heating – April 1978, Hot Water – June 1978

PROJECT TITLE: Existing Subsystems that Require Additional Development

PRINCIPAL INVESTIGATOR: James D. Hankins

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Artech Corp.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32254

RFP NO.: AP32-75-407

EFFECTIVE DATE: September 30, 1976

DURATION: 12 Months

AMOUNT: $153,306

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Development, fabrication, and delivery of three identical energy (sensible and latent) storage subsystems which can be used with solar heating (air) and heating/cooling (air) systems. Determine optimum eutectic salt mixture (sodium thiosulphate pentahydrate and sodium sulfate decahydrate) for heat and coolness storage. Document design, provide formal qualification and independent agency certification.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Storage	3	6'x6'x6' Cooling 235,000 BTU Heating 800,000 BTU	September 1977

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	January 1976
Prototype Design Review	April 1977
First Article Review	July 1977

PROJECT TITLE: Existing Subsystems that Require Additional Development

PRINCIPAL INVESTIGATOR: John M. Caudle

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Calmac Manufacturing Corp.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32253

RFP NO.: AP32-75-407

EFFECTIVE DATE: October 15, 1976

DURATION: 11 Months

AMOUNT: $46,508

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Complete the development of a fluid pump powered by heat from a solar concentrating collector. Document the design, provide formal qualification and independent agency certification.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Solar Heat Operated Fluid Pump	3	10 Gals/min.	September 1977

Government Furnished Parts Required:

Item	Quantity	Delivery Date
To be determined		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	January 1977
Subsystem Design Review	July 1977
First Article Review	August 1977

PROJECT TITLE: Existing Subsystems that Require Additional Development

PRINCIPAL INVESTIGATOR: John M. Caudle

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Calmac Manufacturing Corp.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32253

RFP NO.: AP32-75-407

EFFECTIVE DATE: October 15, 1976

DURATION: 11 Months

AMOUNT: $133,374

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Complete the adaptation and development of an extruded epom rubber (an elastomer) tubing for solar flat plate liquid collector application. Establish subsystem performance specifications and conduct test to verify that collector meets performance specifications. Prepare installation, operation and maintenance manuals. Provide formal qualification and obtain independent agency certification.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Liquid Flat Plate Collector	300 Sq. Ft.	2 – 4'x8' Panels (Remainder to be determined)	September 1977

Government Furnished Parts Required:

Item	Quantity	Delivery Date
To be determined		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	January 1977
Subsystem Design Review	July 1977
First Article Review	August 1977

PROJECT TITLE: Existing Subsystems that Require Additional Development

PRINCIPAL INVESTIGATOR: John M. Caudle

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Houston Chemical Corp.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: To be determined

RFP NO.: AP32-75-407

EFFECTIVE DATE: To be determined

DURATION: 26 Months

AMOUNT: $212,000

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Provide extensive testing effort to provide data base on performance of existing solar heating and cooling transport fluids and develop new transport fluids. Provide documentation of results and independent agency certification of new fluids developed.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Heat Transport Fluid	300 Gal.		December 1978

Government Furnished Parts Required:

Item	Quantity	Delivery Date
To be determined		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	February 1977
Subsystem Design Review	February 1978
First Article Review	September 1978

PROJECT TITLE: Existing Subsystems that Require Additional Development

PRINCIPAL INVESTIGATOR: John M. Caudle

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Life Sciences

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: To be determined

RFP NO.: AP32-75-407

EFFECTIVE DATE: To be determined

DURATION: One year

AMOUNT: $141,594

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Complete the development of an air flat plate collector. Establish subsystem performance specification and conduct tests to verify that the collector meets the specification. Prepare installation, operation and maintenance manuals. Provide formal qualification and obtain independent agency certification.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Air Flat Plate Collector	300 Sq. Ft.	4'x8'	October 30, 1977

Government Furnished Parts Required:

Item	Quantity	Delivery Date
To be determined		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	December 1976
System Design Review	February 1977
Subsystem Design Review	July 1977
First Article Review	October 1977

PROJECT TITLE: Existing Subsystems that Require Additional Development

PRINCIPAL INVESTIGATOR: John M. Caudle

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Northrup, Inc.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32251

RFP NO.: AP32-75-407

EFFECTIVE DATE: October 1, 1976

DURATION: 16 Months

AMOUNT: $334,852

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Complete the design of a concentrating collector, adding an acrylic fresnel lens (doubling area). Improve performance and manufacturing cost. Document the design, provide formal qualification and independent agency certification.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Concentrating Collector	300 Sq. Ft. Total	2'x10' Each Unit	February 1978

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	January 1977
System Design Review	July 1977
Operational Test Review	January 1978

PROJECT TITLE: Existing Subsystems That Require Additional Development

PRINCIPAL INVESTIGATOR: John M. Caudle

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Owens Illinois

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: To be determined

RFP NO.: AP32-75-407

EFFECTIVE DATE: To be determined

DURATION: 12 Months

AMOUNT: $275,684

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Complete the design of an air/liquid vacuum collector (manifoiding and duct work) obtain life and failure information, document the design, provide formal qualifications and independent agency certification.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Air/Liquid Vacuum Collector	300 Sq. Ft.	55 Sq. Ft. (98 tube) Sub-elements	October 1977

Government Furnished Parts Required:

Item	Quantity	Delivery Date
To be determined		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	January 1977
System Design Review	March 1977
First Article Review	August 1977

PROJECT TITLE: Existing Subsystems that Require Additional Development

PRINCIPAL INVESTIGATOR: John M. Caudle

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Raypac, Inc.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: To be determined

RFP NO.: AP32-75-407

EFFECTIVE DATE: To be determined

DURATION: 12 Months

AMOUNT: $32,077 (Est.)

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Complete performance testing on existing design. Modify design as required to meet performance specifications. Prepare installation, operation and maintenance manuals. Document the design, provide formal qualification and obtain independent agency certification.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Liquid Flat Plate Collector	300 Sq. Ft.	3'x6' Panels	August 1977

Government Furnished Parts Required:

Item	Quantity	Delivery Date
To be determined		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	January 1977
Subsystem Design Review	April 1977
First Article Review	July 1977

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PROJECT TITLE: Existing Subsystems that Require Additional Development

PRINCIPAL INVESTIGATOR: James D. Hankins

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Rho Sigma

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32256

RFP NO.: AP32-75-407

EFFECTIVE DATE: October 1976

DURATION: 9 Months

AMOUNT: $45,196

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Development, fabrication and delivery of three identical microprocessor controller subsystems which can be used in solar heating, heating and cooling, and/or hot water systems for single-family, multi-family, or small commercial applications. Document the design, provide formal qualification and independent agency certification.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Controller	3		June 1977

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	December 1976
Prototype Design Review	March 1977
First Article Review	May 1977

PROJECT TITLE: Existing Subsystems that Require Additional Development

PRINCIPAL INVESTIGATOR: James D. Hankins

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Sigma Research, Inc.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32260

RFP NO.: AP32-75-407

EFFECTIVE DATE: October 1976

DURATION: 12 Months

AMOUNT: $91,831

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Explore possibility of incorporating larger diameter tubes in heat exchanger and/or substituting aluminum fins for copper fins on the heat exchanger tube exterior for thermal and cost benefits. Explore methods for maximizing module durability. Design low cost, appealing module shell. Identify an economical water shut-off valve.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Heat Exchanger	3	17,000 BTU/Hr.	September 1977

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	January 1976
Prototype Design Review	April 1977
First Article Review	July 1977

PROJECT TITLE: Existing Subsystems that Require Additional Development

PRINCIPAL INVESTIGATOR: James D. Hankins

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Sunkeeper Control Corp.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-38257

RFP NO.: AP32-75-407

EFFECTIVE DATE: October 1976

DURATION: 12 Months

AMOUNT: $97,000

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Development, fabrication and delivery of three identical electronic controller and hydronics packages which can be used in solar heating, heating and cooling, and cooling, and/or hot water systems for single-family, multi-family or small commercial applications. Document the design, provide formal qualification and independent agency certification.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Electronic Controller and Hydronics Package	3	Single-family, Multi-family or Commercial	October 1977

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	November 1976
Prototype Design Review	January 1977
First Article Review	March 1977

PROJECT TITLE: Existing Subsystems that Require Additional Development

PRINCIPAL INVESTIGATOR: James D. Hankins

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Zia Associates

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32258

RFP NO.: AP32-75-407

EFFECTIVE DATE: October 1976

DURATION: 6 Months

AMOUNT: $56,313

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Development, fabrication and delivery of three identical modular control subsystems which can be used in solar heat-systems for multi-family buildings. Document the design, provide formal qualification and independent agency certification.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Controller	3	Multi-family	April 1977

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	December 1976
Prototype Design Review	January 1976
First Article Review	February 1976

PROJECT TITLE: Marketable Subsystems

PRINCIPAL INVESTIGATOR: Earle Harris

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Honeywell, Inc.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32094

RFP NO.: AP32-75-408

EFFECTIVE DATE: June 25, 1976

DURATION: 35 Days

AMOUNT: $3,970

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Provide Liquid Flat Plate Collector: Double glazed with antireflective black chrome coating, and Fiberglass insulation. This hardware will be provided to IBM as Government Furnished Equipment for proposed integration into one (or more) of the 14 prototype systems provided under the system integration contract.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Liquid Flat Plate Collector	180 Sq. Ft.		October 12, 1976

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	None
System Design Review	
Operational Test Review	

PROJECT TITLE: Marketable Subsystems

PRINCIPAL INVESTIGATOR: Earle Harris

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Libbey-Owens-Ford

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32095

RFP NO.: AP32-75-408

EFFECTIVE DATE: July 7, 1976

DURATION: 90 Days

AMOUNT: $4,660

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Provide Liquid Flat Plate Collector: Double glazed/tempered glass, 101-C10 coating, and Fiberglass insulation. This hardware will be provided to IBM as Government Furnished Equipment for proposed integration into one (or more) of the 14 prototype systems provided under the system integration contract.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Liquid Flat Plate Collector	300 Sq. Ft.		November 10, 1976

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	None
System Design Review	
Operational Test Review	

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PROJECT TITLE: Marketable Subsystems

PRINCIPAL INVESTIGATOR: Earle Harris

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Martin Marietta Corp.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: D(49-26)-1024

CONTRACT NO.: NAS8-32096

RFP NO.: AP32-75-408

EFFECTIVE DATE: June 28, 1976

DURATION: 90 Days

AMOUNT: $6,400

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Provide Liquid Flat Plate Collector: Double glazed, tempered glass; Black anodized coating; and Vermiculite insulation. This hardware will be provided to IBM as Government Furnished Equipment for proposed integration into one (or more) of the 14 prototype systems integration contract.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Liquid Flat Plate Collectors	300 Sq. Ft.		October 5, 1976

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	None
System Design Review	
Operational Test Review	

PROJECT TITLE: Marketable Subsystems

PRINCIPAL INVESTIGATOR: Earle Harris

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Northrup, Inc.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32097

RFP NO.: AP32-75-408

EFFECTIVE DATE: July 22, 1976

DURATION: 75 Days

AMOUNT: $28,500

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Provide Concentrating Collector: Fresnel lens; Aluminumized mylar reflector; 101-C10 coating; and Fiberglass insulation. This hardware will be provided to IBM as Government Furnished Equipment for proposed integration into one (or more) of the 14 prototype systems provided under the system integration contract.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Concentrating Collector	1200 Sq. Ft.		October 26, 1976

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	None
System Design Review	
Operational Test Review	

PROJECT TITLE: Marketable Subsystems

PRINCIPAL INVESTIGATOR: Earle Harris

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Rho Sigma

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32098

RFP NO.: AP32-75-408

EFFECTIVE DATE: July 8, 1976

DURATION: 60 Days

AMOUNT: $5,286

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Provide Controller: Differential thermostat. This hardware will be provided to IBM as Government Furnished Equipment for proposed integration into one (or more) of the 14 prototype systems provided under the system integration contract.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Controller	3 Each		September 15, 1976

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	None
System Design Review	
Operational Test Review	

PROJECT TITLE: Marketable Subsystems

PRINCIPAL INVESTIGATOR: Earle Harris

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Solar Energy Products, Inc.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32099

RFP NO.: AP32-75-408

EFFECTIVE DATE: June 22, 1976

DURATION: 65 Days

AMOUNT: $18,288

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Provide Air Flat Plate Collector: Single glaze, herculite glass; Sherwin-Williams black paint; Corrugated Aluminum plate; and Isocyanate foam board. This hardware will be provided to IBM as Government Furnished Equipment for proposed integration into one (or more) of the 14 prototype systems provided under the system integration contract.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Air Flat Plate Collector	2200 Sq. Ft.		October 12, 1976

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	None
System Design Review	
Operational Test Review	

PROJECT TITLE: Marketable Subsystems

PRINCIPAL INVESTIGATOR: Earle Harris

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Solar Energy Systems, Inc.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32100

RFP NO.: AP32-75-408

EFFECTIVE DATE: July 23, 1976

DURATION: 90 Days

AMOUNT: $6,150

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Provide Concentrating Collector: Single glazed, tempered glass; Teflon coated aluminum mylar reflector; 101-C10 coating; Aluminum fin tubing; and Urethane/fiberglass insulation. This hardware will be provided to IBM as Government Furnished Equipment for proposed integration into one (or more) of the 14 prototype systems provided under the system integration contract.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Concentrating Collector	300 Sq. Ft.		November 15, 1976

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	
System Design Review	
Operational Test Review	None

PROJECT TITLE: Marketable Subsystems

PRINCIPAL INVESTIGATOR: Earle Harris

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Solargenics, Inc.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32101

RFP NO.: AP32-75-408

EFFECTIVE DATE: June 28, 1976

DURATION: 90 Days

AMOUNT: $28,905

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Provide Liquid Flat Plate Collector: Single glazed; Black chrome coating; Copper tube & header; Aluminum plate; and Isocyanate foam insulation. This hardware will be provided to IBM as Government Furnished Equipment for proposed integration into one (or more) of the 14 prototype systems provided under the system integration contract.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Liquid Flat Plate Collector	1800 Sq. Ft.		August 10, 1976

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	
System Design Review	
Operational Test Review	None

PROJECT TITLE: Marketable Subsystems

PRINCIPAL INVESTIGATOR: Earle Harris

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Solaron Corp.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32102

RFP NO.: AP32-75-408

EFFECTIVE DATE: June 25, 1976

DURATION: 45 Days

AMOUNT: $33,500

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Provide Flat Plate Collector: Double glazed, fourco glass; PPG duracron 600 black coating; Steel plate; and Fiberglass insulation. This hardware will be provided to IBM as Government Furnished Equipment for proposed integration into one (or more) of the 14 prototype systems provided under the system integration contract.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Air Flat Plate Collector	2200 Sq. Ft.		July 12, 1976

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	
System Design Review	
Operational Test Review	None

PROJECT TITLE: Marketable Subsystems

PRINCIPAL INVESTIGATOR: Earle Harris

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Sun Works, Inc.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32103

RFP NO.: AP32-75-408

EFFECTIVE DATE: June 22, 1976

DURATION: 30 Days

AMOUNT: $3,400

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Provide Air Flat Plate Collector: Single glazed, tempered glass; Black copper oxide coating; Copper plate; Fiberglass/urethane insulation. This hardware will be provided to IBM as Government Furnished Equipment for proposed integration into one (or more) of the 14 prototype systems provided under the system integration contract.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Air Flat Plate Collector	300 Sq. Ft.		November 15, 1976

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	
System Design Review	
Operational Test Review	None

PROJECT TITLE: Marketable Subsystems

PRINCIPAL INVESTIGATOR: Earle Harris

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Sun Works, Inc.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32103

RFP NO.: AP32-75-408

EFFECTIVE DATE: June 22, 1976

DURATION: 30 Days

AMOUNT: $3,400

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Provide Liquid Flat Plate Collector: Single glaze, tempered glass; Black copper oxide coating; Copper tube & header; Copper sheet; and Fiberglass/urethane insulation. This hardware will be provided to IBM as Government Furnished Equipment for proposed integration into one (or more) of the 14 prototype systems provided under the system integration contract.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Liquid Flat Plate Collector	300 Sq. Ft.		November 15, 1976

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	
System Design Review	
Operational Test Review	None

PROJECT TITLE: Marketable Subsystems

PRINCIPAL INVESTIGATOR: Earle Harris

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Sun Works, Inc.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32103

RFP NO.: AP32-75-408

EFFECTIVE DATE: June 22, 1976

DURATION: 30 Days

AMOUNT: $900

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Provide Storage Tank: Ceramic lined; Fiberglass insulation; and Internal heat exchange/copper coil. This hardware will be provided to IBM as Government Furnished Equipment for proposed integration into one (or more) of the 14 prototype systems provided under the system integration contract.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Storage Tank	3 Each	65 Gal.	November 15, 1976

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	
System Design Review	
Operational Test Review	None

PROJECT TITLE: Marketable Subsystems

PRINCIPAL INVESTIGATOR: Earle Harris

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: Ying Manufacturing, Inc.

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32104

RFP NO.: AP32-75-408

EFFECTIVE DATE: June 9, 1976

DURATION: 9 Weeks

AMOUNT: $44,784

PROGRAM SUMMARY

DESCRIPTION OF EFFORT: Provide Liquid Flat Plate Collector: Double glazed, lexan; Black epoxy coating; Steel tube & header; Aluminum plate; and Urethane insulation. This hardware will be provided to IBM as Government Furnished Equipment for proposed integration into one (or more) of the 14 prototype systems provided under the system integration contract.

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
Liquid Flat Plat Collector Model #SS 4120	3600 Sq. Ft.		September 20, 1976

Government Furnished Parts Required:

Item	Quantity	Delivery Date
None		

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	None
System Design Review	
Operational Test Review	

PROJECT TITLE: System Integration of Marketable Subsystems

PRINCIPAL INVESTIGATOR: Earle G. Harris

ORGANIZATION: George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Huntsville, Alabama

CONTRACTOR: IBM

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-26)-1024

CONTRACT NO.: NAS8-32036

RFP NO.: AP32-75-405

EFFECTIVE DATE: April 13, 1976

DURATION: 3 Years and 22 Weeks

AMOUNT: $8,440,000

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PROGRAM SUMMARY

DESCRIPTION OF EFFORT:

1. Integrate GFP Subsystem into 14 Solar Heating and Cooling Systems
2. Deliver 60 Site Data Collection Subsystems
3. Process data from 60 Operational test sites
4. Perform system analysis (40,000 manhours level of effort)–Support MSFC change integration (40,000 manhours level of effort)
5. Operate and perform test evaluation of MSFC test facilities (188,000 manhours level of effort)

DELIVERABLE HARDWARE:

Nomenclature	Quantity	Size/Capacity	Delivery Date
1. Solar Heating and Cooling Systems	14	Various	Begin in December 1, 1976. End May, 1978.
2. Site Data Collection Subsystems	60	30 parameter	Begin September 1976. End February 1978.

Government Furnished Parts Required:

Item	Quantity	Delivery Date
Subsystems – Collectors, Controls and Storage for Heating, Cooling and Hot Water	111 Total	3 months prior to IBM delivery of Solar Heating and Cooling Systems

SIGNIFICANT MILESTONES:

	Date
Preliminary Design Review	Numerous (refer to contract)
System Design Review	
Operational Test Review	

SECTION II

STANDARDS AND CRITERIA DEVELOPMENT

PROJECT TITLE: Consulting and Advisory Service (Design of Demonstration Programs; System/Subsystem and Project Selection; and Proposal Evaluations)

PRINCIPAL INVESTIGATOR: Robert D. Dikkers, Program Manager

ORGANIZATION: Office of Housing and Building Technology
Center for Building Technology, IAT
National Bureau of Standards

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-1)-3800

EFFECTIVE DATE: July 1, 1975

DURATION: Continuing activity 1975-1980

AMOUNT: FY 76: $20,000
TQ: $10,000

PROGRAM SUMMARY

Technical support is being provided by NBS to ERDA on an as needed basis in order to expedite the timely and successful completion of the solar demonstration program. This technical support has included the participation of NBS staff members on technical evaluation boards reviewing proposed systems submitted for consideration under the ERDA Program Opportunity Announcement (POA) and Program Opportunity Notice (PON) programs, the review of ERDA contractor reports, and the provision of technical advice when requested.

It is expected that ERDA will have a continual need for this type of technical support as various phases of the solar demonstration program are made operational.

PROJECT TITLE: Interim Performance Criteria (Commercial Solar Heating and Cooling Systems)

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-1)-3800

PRINCIPAL INVESTIGATOR: David Waksman

EFFECTIVE DATE: July 1, 1975

DURATION: 17 Months (Initial Revision)

ORGANIZATION: Office of Housing and Building Technology
Center for Building Technology, IAT
National Bureau of Standards

AMOUNT: FY 76: $160,000

PROGRAM SUMMARY

NBS has developed for ERDA a document containing interim performance criteria intended for use in the ERDA commercial demonstration program. These criteria represent a first revision of the criteria for commercial applications, written by NASA (February 28, 1975 draft), which were based on the NBS interim performance criteria for residential applications.

The final draft of the revised commercial criteria was completed in July of 1976, and published copies will be ready in November 1976. Additional revisions of the commercial criteria document are planned during 1977-1980 as feedback information is gained from the commercial demonstration program.

PROJECT TITLE: Evaluation of Solar Systems Proposed for Demonstration in Residential and Commercial Buildings

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-1)-3800

PRINCIPAL INVESTIGATOR: Robert D. Dikkers/William Niessing

EFFECTIVE DATE: May 1976

DURATION: Continuing Activity 1976-1979

ORGANIZATION: Office of Housing and Building Technology
Center for Building Technology, IAT
National Bureau of Standards

AMOUNT: FY 76: $20,000
TQ: $60,000

PROGRAM SUMMARY

An interdisciplinary team of NBS staff members has been selected to review and monitor the evaluation of systems, subsystems, and components proposed by means of the Program Opportunity Announcement (POA) for ERDA's solar demonstration of residential and commercial buildings.

NBS will assist ERDA in the preparation of the POA document and will conduct the review and evaluation of systems, subsystems, and components proposed for consideration under the POA on an as submitted basis.

PROJECT TITLE: Technical Performance Data Requirements (Commercial Demonstration Program)

PRINCIPAL INVESTIGATOR: Robert D. Dikkers/David Waksman

ORGANIZATION: Office of Housing and Building Technology
Center for Building Technology, IAT
National Bureau of Standards

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-1)-3800

EFFECTIVE DATE: July 1, 1975

DURATION: Two Years

AMOUNT: FY 76: $75,000
TQ: $30,000

PROGRAM SUMMARY

NBS is developing an instrumentation and non-instrumentation data requirements plan establishing the technical performance data to be collected during the ERDA commercial demonstration program. The plan considers the various types and amounts of technical performance data (i.e., thermal performance, durability/reliability, maintenance, safety, installation) needed to develop definitive performance criteria for solar heating and cooling systems and to effectively evaluate the technical performance of demonstration projects.

The development of a plan, scope, and outline was completed and submitted to ERDA for review in December 1975. A preliminary draft plan was completed in May 1976 and submitted for review. The final plan for thermal data requirements (NBSIR76-1137) was published in September 1976. Completion of the plan describing non-instrumented data requirements is scheduled for November 1976.

PROJECT TITLE: Monitor Commercial Demonstrations for Feedback

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: F(49-1)-3800

PRINCIPAL INVESTIGATOR: Robert D. Dikkers/David Waksman

EFFECTIVE DATE: July 1, 1975

DURATION: Continuing Activity 1975-1980

ORGANIZATION: Office of Housing and Building Technology
Center for Building Technology, IAT
National Bureau of Standards

AMOUNT: FY 76: $40,000
TQ: $40,000

PROGRAM SUMMARY

In conjunction with ERDA, NASA, other concerned government agencies, and the demonstration contractors, an NBS interdisciplinary team will monitor data obtained during the design, construction, and operational phases of the demonstration program and feedback the experience gained into the revision and development of performance criteria for commercial applications.

The level of NBS activity on this program will parallel ERDA's progress in establishing demonstration projects.

PROJECT TITLE: Test and Evaluation of Solar Systems and Subsystems

PRINCIPAL INVESTIGATOR: Robert D. Dikkers/Kenneth DeCorte

ORGANIZATION: Office of Housing and Building Technology
Center for Building Technology, IAT
National Bureau of Standards

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-1)-3800

EFFECTIVE DATE: July 1, 1975

DURATION: Continuing Activity 1975-1980

AMOUNT: FY 76: $180,000

PROGRAM SUMMARY

NBS's solar team will work with appropriate organizations in the public and private sectors monitoring the testing and evaluation of systems and subsystems developed under the ERDA solar program. In April 1976, NBS completed the review and evaluation of eleven solar system test plans, submitted by companies whose systems were found, by ERDA, to require further testing in the first evaluation cycle of the Program Opportunity Announcement (POA). Contracts are being awarded for testing in accordance with the agreed upon test plans. Monitoring of the test plans and evaluation of same will be accomplished as required.

PROJECT TITLE: Development of Materials Standards–Problem Identification (Solar Heating and Cooling Applications)

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-1)-3800

PRINCIPAL INVESTIGATOR: Leopold F. Skoda

EFFECTIVE DATE: March 1976

DURATION: 13 Months

ORGANIZATION: Materials and Composites Section
Center for Building Technology, IAT
National Bureau of Standards

AMOUNT: FY 76: $102,000

PROGRAM SUMMARY

This project will consist of studies to identify the materials areas in solar heating and cooling systems for which standards are most urgently needed. Materials used in systems already in operation that exhibit problems will be identified by communicating with manufacturers, contractors, designers, and by the conduct of actual field inspections.

The final report to be published in May 1977, will contain recommendations and guidelines for the use of materials in solar heating and cooling systems. In addition, currently available materials standards will be identified and assessed as to their applicability for use in solar energy systems.

PROJECT TITLE: Development of Standards for Collector Insulation

PRINCIPAL INVESTIGATOR: McClure Godette

ORGANIZATION: Materials and Composites Section
Center for Building Technology, IAT
National Bureau of Standards

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-1)-3800

EFFECTIVE DATE: May 1, 1976

DURATION: 24 Months

AMOUNT: FY 76: $30,000
TQ: $35,000

PROGRAM SUMMARY

The conditions to which a solar collector's insulation are exposed may be very different than those observed in typical building applications. The purpose of this program is to develop a draft performance standard by identifying performance requirements for collector insulation, performing laboratory studies to develop test methods, and evaluating materials according to the identified performance requirements.

A detailed work plan and outline of the standard is scheduled for completion in October 1976 followed by a preliminary draft standard in July 1977. The final draft standard will be submitted in June 1978 to American Society for Testing & Materials (ASTM) for consideration as a consensus standard.

PROJECT TITLE: Development of Standards for Flat Cover Plates

PRINCIPAL INVESTIGATOR: Elizabeth J. Clark

ORGANIZATION: Materials and Composites Section
Center for Building Technology, IAT
National Bureau of Standards

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-1)-3800

EFFECTIVE DATE: May 1, 1976

DURATION: Three years

AMOUNT: FY 76: $110,000
TQ: $40,000

PROGRAM SUMMARY

The purpose of this program is to develop a draft standard for cover plates used in solar collectors. Of prime importance is the transmittance of solar energy. For a solar heating and cooling system to maintain its efficiency, the cover plates of the solar collector panels must have adequate initial performance and not degrade significantly during their life.

Performance requirements for cover plates will be identified. Laboratory studies will then be performed to determine if the cover plate materials meet the requirements and procedures will be developed as needed, to measure performance.

A detailed work plan and outline of the standard will be completed in October 1976. A preliminary draft standard will be developed in January 1977, and a draft interim standard is scheduled for July 1977. The draft standards will be submitted to American Society for Testing & Materials (ASTM) for consideration as a consensus standard. Additional updated test methods will be developed during 1977-1980 and submitted to ASTM.

PROJECT TITLE: Development of Standards for Liquid (Gunable or Tape) Sealants and Preformed Gaskets

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-1)-3800

PRINCIPAL INVESTIGATOR: Larry W. Masters

EFFECTIVE DATE: May 1, 1976

DURATION: 18 Months

ORGANIZATION: Materials and Composites Section
Center for Building Technology, IAT
National Bureau of Standards

AMOUNT: FY 76: $30,000
TQ: $24,000

PROGRAM SUMMARY

Although standards are available, liquid joint sealants and pre-formed gaskets used in solar energy systems may be exposed to conditions which differ substantially from those used in other building applications. Therefore, this program will develop draft preformance standards for sealants and gaskets used in solar systems. The standard will include procedures for determining chemical and thermal stability, compatibility, UV stability, and decomposition such as outgassing.

A detailed work plan and outline of the standard was completed in September 1976. A preliminary draft standard is scheduled for completion in March 1977. The final draft standard will be completed and submitted to American Society for Testing & Materials (ASTM) for consideration as a consensus standard in November of 1977.

PROJECT TITLE: Interim Performance Criteria for Solar Heating and Cooling Systems and Dwellings

PRINCIPAL INVESTIGATOR: Robert D. Dikkers/David Waksman

ORGANIZATION: Office of Housing and Building Technology
Center for Building Technology, IAT
National Bureau of Standards

AGENCY: HUD

INTERAGENCY AGREEMENT NO.: H-55-74

EFFECTIVE DATE: August 1974

DURATION: 4 Months (Initial Document)

AMOUNT: FY 75: $210,000

PROGRAM SUMMARY

In accordance with PL 93-409 enacted on September 3, 1974 HUD, utilizing the services of NBS, was required to develop and publish within 120 days an interim performance criteria for solar heating and cooling of residential dwellings.

The Interim Performance Criteria for Solar Heating and Cooling Systems and Dwellings was completed on schedule and transmitted to HUD (as NBSIR 75-636) on December 31, 1974.

During FY 1977-1980, feedback information gained through the Solar Energy Residential Demonstration Program will be utilized by NBS to develop revisions to the interim performance criteria.

PROJECT TITLE: Conceptual Solar Dwelling Designs

AGENCY: HUD

INTERAGENCY AGREEMENT NO.: H-55-74

PRINCIPAL INVESTIGATOR: Thomas K. Faison/Robert D. Dikkers

EFFECTIVE DATE: December 1974

DURATION: 17 Months

ORGANIZATION: Office of Housing and Building Technology
Center for Building Technology, IAT
National Bureau of Standards

AMOUNT: FY 75: $120,000
FY 76: $42,800

PROGRAM SUMMARY

NBS obtained and monitored the contractual services of the American Institute of Architects/Research Corporation (AIA/RC) and the American Society of Landscape Architects Foundation (ASLAF) to develop a resource document containing conceptual building designs and site concepts pertaining to solar heating and cooling.

Camera-ready copy for this resource document for conceptual building designs and site concepts entitled, "Solar Dwelling Design Concepts," was completed and transmitted to HUD in April 1976. Published copies are now available through the U.S. Government Printing Office (Stock No. 023-000-00334-1).

PROJECT TITLE: Technical Performance Data Requirements (Residential Demonstration Projects)

PRINCIPAL INVESTIGATOR: Robert D. Dikkers/David Waksman

ORGANIZATION: Office of Housing and Building Technology
Center for Building Technology, IAT
National Bureau of Standards

AGENCY: HUD

INTERAGENCY AGREEMENT NO.: H-38-76

EFFECTIVE DATE: July 1, 1975

DURATION: 18 Months

AMOUNT: FY 76: $75,000
TQ: $30,000

PROGRAM SUMMARY

NBS is developing an instrumentation and non-instrumentation data requirements plan establishing technical performance data to be collected during the HUD residential demonstration program. The plan considers the various types and amounts of technical performance data (i.e., thermal performance, durability/reliability, maintenance, safety, installation) needed to develop definitive performance criteria for solar heating and cooling systems and to effectively evaluate the technical performance of demonstration projects.

The development of a plan scope and outline was completed and submitted to HUD for review in November 1975. A preliminary draft plan was completed in February 1976. The final plan for thermal data requirements (NBSIR 76-1137) was published in September 1976. Completion of the plan describing non-instrumented data requirements is scheduled for November 1976.

PROJECT TITLE: Intermediate Standards for Solar Applications (Residential Solar Heating and Cooling Program)

PRINCIPAL INVESTIGATOR: John K. Holton

ORGANIZATION: Office of Housing and Building Technology
Center for Building Technology, IAT
National Bureau of Standards

AGENCY: HUD

INTERAGENCY AGREEMENT NO.: H-38-76

EFFECTIVE DATE: July 1, 1975

DURATION: Two years

AMOUNT: FY 76: $270,000
TQ: $50,000

PROGRAM SUMMARY

NBS has worked with appropriate organizations in the private sector in the development of HUD's FHA Intermediate Minimum Property Standards for solar heating and domestic hot water systems. These intermediate standards are based on the current state-of-the-art, the HUD Minimum Property Standards (MPS), and the Interim Performance Criteria previously developed for HUD. These intermediate standards establish requirements, evaluation procedures, and good engineering practices for solar heating and hot water systems which are comparable to those presently used for conventional systems, subsystems, components, and materials. They are intended to help expedite FHA insured mortgage financing for solar heating and hot water equipment.

The final draft report (NBSIR 76-1059) for public review was completed and submitted to HUD in April 1976. The public review period runs from July 12 – August 27, 1976. A revised report, based upon a review of comments received, will be resubmitted to HUD in December 1976.

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PROJECT TITLE: System Qualification and Testing
(Residential Solar Heating and Cooling Program)

AGENCY: HUD

INTERAGENCY AGREEMENT NO.: H-38-76

PRINCIPAL INVESTIGATOR: Robert D. Dikkers

EFFECTIVE DATE: July 1, 1975

DURATION: Continuing Activity 1975-1979

ORGANIZATION: Office of Housing and Building Technology
Center for Building Technology, IAT
National Bureau of Standards

AMOUNT: FY 76: $50,000
TQ: $20,000

PROGRAM SUMMARY

NBS has assembled a team of interdisciplinary personnel to assist HUD in the evaluation of project proposals. This team also has the responsibility for monitoring the analysis and testing of systems selected for the residential demonstration program to determine whether selected solar energy systems meet the interim performance criteria and to document where these systems deviate from these criteria.

The monitoring of the analysis and testing of systems selected will be done on an as required basis.

PROJECT TITLE: Development and Implementation of Standards (Solar Heating and Cooling Applications), and NBS Participation in Standards Organization Activities

PRINCIPAL INVESTIGATOR: Robert D. Dikkers/David Waksman

ORGANIZATION: Office of Housing and Building Technology
Center for Building Technology, IAT
National Bureau of Standards

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-1)-3800

EFFECTIVE DATE: March, 1976

DURATION: Continuing Activity 1975-1980

AMOUNT: FY 76: $35,000
TQ: $ 2,000

PROGRAM SUMMARY

This project concerns both the preparation of a plan to identify and coordinate the development and implementation of standards, and NBS participation in standards organization activities.

In January of 1976, the American National Standards Institute (ANSI) established a Solar Energy Steering Committee. This committee which NBS currently chairs, held its first meeting April 9, 1976 and will help identify standards needs; recommend standards development projects; and coordinate the overall solar heating and cooling standards development activity. Other solar standards related organizations in which NBS staff members are actively participating include the American Society of Testing and Materials (ASTM) and the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE).

The plan to guide the development and implementation of standards for solar heating and cooling applications was coordinated with the ANSI solar energy steering committee and was published in September 1976 (NBSIR 76-1143). This plan will be periodically updated to reflect the status of various standard development projects.

PROJECT TITLE: Monitor Residential Demonstrations and Data Evaluation

PRINCIPAL INVESTIGATOR: Robert D. Dikkers/John K. Holton

ORGANIZATION: Office of Housing and Building Technology
Center for Building Technology, IAT
National Bureau of Standards

AGENCY: HUD

INTERAGENCY AGREEMENT NO.: H-38-76

EFFECTIVE DATE: September 1, 1976

DURATION: Continuing Activity 1976-1980

AMOUNT: TQ: $80,000

PROGRAM SUMMARY

In conjunction with HUD, ERDA, NASA and various demonstration program contractors, an NBS interdisciplinary team will monitor data obtained during the design, construction, and operational phases of the residential demonstration program and feedback the experience gained into the revision and development of performance criteria for residential applications.

Overall program studies evaluating and conducting dwelling/system performance will be conducted in the following areas: (1) thermal performance; (2) habitability and occupant responses; (3) durability/reliability; (4) operational (mechanical) problems; (5) maintainability; (6) safety; (7) building regulatory process constraints; and (8) design/construction process problems.

PROJECT TITLE: Processing Non-Instrumented Data (Residential Demonstration Program)

PRINCIPAL INVESTIGATOR: Robert D. Dikkers/Martin Aronoff

ORGANIZATION: Office of Housing and Building Technology
Center for Building Technology, IAT
National Bureau of Standards

AGENCY: HUD

INTERAGENCY AGREEMENT NO.: H-38-76

EFFECTIVE DATE: September 1, 1976

DURATION: Continuing Activity 1975-1980

AMOUNT: TQ: $20,000

PROGRAM SUMMARY

The objective of this project is to provide a central location for the storage, computer processing and reduction of non-instrumentation data to be collected from the solar residential demonstration projects. Non-instrumentation data (technical and non-technical) will be collected by HUD contractors and transmitted to NBS. Technical data cover measurement of equipment performance, building and solar equipment descriptions, design and construction data and problems, and solar equipment failure data in the operational phase. Non-technical data cover costs, builder experience, occupant feedback, financing problems, regulatory problems, utility reactions, etc. Instrumentation data are to collected by Site Data Acquisition Systems and transmitted for storage and processing at NASA Marshall Space Flight Center.

Non-instrumentation data reports containing reduced data will be prepared by NBS and transmitted to HUD, ERDA and various users and contractors as identified by HUD and ERDA. Initial preliminary data reports will be issued by NBS in January 1977.

PROJECT TITLE: Development of Standards for Absorptive Coatings Standards

PRINCIPAL INVESTIGATOR: Larry W. Masters

ORGANIZATION: Materials and Composites Section
Center for Building Technology, IAT
National Bureau of Standards

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-1)-3800

EFFECTIVE DATE: September 1, 1976

DURATION: Two Years

AMOUNT: TQ: $25,000

PROGRAM SUMMARY

The purpose of this program is to develop a draft standard for absorptive coatings used on absorber plates. Of prime importance is the ability of the absorptive coatings to enhance the desirable absorptance and emittance characteristics of the absorber plates to collect insolation without degradation. For a solar heating and cooling system to maintain its efficiency, the absorptive coating of the absorber plates must retain its initial absorptance and emittance qualities over the expected useful life-time of the system.

Performance requirements for absorptive coatings will be identified. While numerous standard test methods have been developed for coatings in building construction, none exists for absorptive coatings for use in solar heating and cooling systems since the performance requirements are quite different. Test methods will be developed and laboratory studies will then be performed to determine if the absorptive coatings materials meet the requirements.

A detailed work plan and outline of the standard is scheduled for December 1976, followed by a preliminary draft of the standard in September 1977. The final draft standard will be submitted in September 1978 to the American Society for Testing and Materials (ASTM) for consideration as a consensus standard.

PROJECT TITLE: Accreditation of Laboratories Engaged in the Testing of Solar Collectors

PRINCIPAL INVESTIGATOR: Robert D. Dikkers/William Niessing

ORGANIZATION: Office of Housing and Building Technology
Center for Building Technology, IAT
National Bureau of Standards

AGENCY: ERDA

INTERAGENCY AGREEMENT NO.: E(49-1)-3800

EFFECTIVE DATE: September 1, 1976

DURATION: 15 Months

AMOUNT: TQ: $80,000

PROGRAM SUMMARY

Solar systems consist of conventional HVAC components (furnace, pumps, etc.) and solar unique components such as solar collectors. As protection to the consumer, and assurance of quality and performance, the conventional components are tested and certified by nationally recognized laboratories and institutions such as the American Gas Association, Underwriters Laboratories, and the Air Conditioning and Refrigeration Institute. No similar testing and certification process exists for solar collectors. To protect the consumer and the market for solar systems a standard testing, validation and certification process is necessary.

The purpose of this program is to develop the criteria for the accreditation of laboratories engaged in the testing of solar collectors and to develop a rating standard and program documents for a solar collector certification program. The development of criteria and the identification of qualified solar testing laboratories is scheduled for completion in September 1977 with the organization of the certification program for solar collectors in December 1977.

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